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Abstract This paper studies intergovernmental transfers. Many intergovernmental transfers are said to serve political purposes. We augment a standard model of political career concerns to allow for multilevel governance. When elections are simultaneous, there is no equilibrium with non-zero transfers as the opportunity cost of a transfer is too high. However when elections are staggered, an equilibrium exists with positive transfers. These transfers are motivated by two factors; sabotaging challengers and rent smoothing. These transfers are non-partisan and an artifact of the electoral dynamics as prescribed by an electoral calendar and politicians' career concerns. This model produces an additional insight in understanding intergovernmental grants. These results are discussed with reference to the growing literature on the partisan basis of intergovernmental transfers.

Keywords: Career Concerns, Public Economics, Intergovernmental Transfers

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1 Introduction

Intergovernmental transfers are a large source of revenue for many sub-national governments. Often intergovernmental transfers are allocated according to a formula, or contingent contract. However, many sub-national governments receive discretionary transfers, strings unattached, in what appears to be an unpredictable manner. Moreover, formulas for intergovernmental transfers are subject to change at the discretion of politicians. This paper studies the timing and determinants of discretionary intergovernmental transfers.

Intergovernmental transfers can serve many purposes. Alternatively transfers can serve an allocative role, assisting recipient governments to internalize externalities associated with public good spillovers[1]. In this paper we study the effect of intergovernmental transfers on the accountability of elected representatives. We begin with a model of politics where voters use elections to select and discipline politicians. If politicians are career concerned self-interested actors who consume much of their own budgets as rents it would be surprising to find politicians willingly giving transfers. However, we show that when transfers are expected from a challenger, a current incumbent politician has an incentive to themselves give a transfer. What makes these transfers interesting is that they are non-partisan, which allows us to understand why much of the empirical literature on partisan transfers has met with such limited success.

Political economy models of distributive politics have addressed intergovernmental transfers from two perspectives on how politicians win votes. One point of view is that these politicians target groups of swing voters to capture their votes, as in Dixit and Londregan (1996). Another large literature asserts that politicians target transfers to their core supporters in an effort to motivate their base, see for example Cox and McCubbins (1986). Both theoretical points of departure have been investigated in a number of empirical papers each with varying degrees of success.

However both of these theories of intergovernmental transfers are partisan based. Politicians are partisan actors, and/or voters have partisan preferences in all the exist-

[1]See Oates (1999) for a review of the literature on fiscal federalism in general and intergovernmental transfers in particular.

ing research on intergovernmental transfers. This is quite natural when one considers a transfer of funds as a targeted expenditure. In models of partisan competition parties serve to solve some conflict of interest[2] among voters (i.e. different preferences or geographical locations); the choice of voters being influenced by a positional aspect of the political parties. However elections are not only an opportunity for voters to reveal their preferences for particular regimes, they also serve as the most poignant instance of "incentives" in the political system. As there may exist a conflict of interest between voters and politicians (i.e. if each values the use of scarce resources differently) it is important to recognize that the opportunity for the public to evaluate their elected representatives occurs at the ballot box. Thus we study the effects of transfers on the accountability of both donating and receiving politicians.

In this paper we abstract from the conflict of interest across voters and focus instead on the role of elections in selecting and disciplining politicians. Our approach addresses the issue from its most basic premise: a transfer of resources from one level of government to another requires forfeiting the ability to employ those resources in some other way. We consider an agency model, with office motivated politicians, and voters who desire public goods. From the point of view of politicians, allocating public goods is costly as it decreases the rents they can enjoy from office, however politicians are willing to part with these funds when it increases their ability to win control of office again. When transfers are made between governments they are either swallowed up by the recipient politician, or they augment the public expenditure of that level of government. Given the latter, transfers themselves become coveted by the voters. In our model, voters who in the absence of the prospect of higher spending through transfers would evaluate each government only on their performance in office, now cast their ballots with an additional interest in obtaining transfers.

We show the existence of an equilibrium where transfers take place. The equilibrium with transfers requires politicians at both levels of office simultaneously seeking re-election, but with staggered electoral calendars (their terms in office overlap). The model makes a clear prediction of when we will see intergovernmental transfers without assuming partisan preferences of either voters or incumbent politicians. In addition to this we have a surprising result that in response to receiving a transfer local govern-

[2]Persson and Tabellini (2000) makes this distinction.

ment rent consumption may increase, decrease or remain unchanged depending on the distribution of unobserved political ability.

Our model does not incorporate partisan preferences of politicians. In particular we focus on the role of: self-interested politicians, the electoral calender, and the finiteness of political careers as determinants of the pattern of intergovernmental transfers. This is seen as a complement to existing studies of partisan transfers, rather than a substitute. Moreover, this paper can be seen as a first step in understanding the role of parties in selecting and disciplining politicians in office. Intergovernmental transfers occur to influence the future re-election prospects of the donating politician. However in a situation in which partisan approval is necessary to facilitate rent extraction, for example through a legislative check on the executive or some other aspect of the internal organization of the party[3], these transfers may be side payments to the constituents in return for current political support.

The paper progresses as follows. In section 2 we address the literature on intergovernmental transfers. In section 3 we present the model. Section 4 solves the model. In section 5 we discuss the results. In section 6 we conclude.

2 Previous Explanations and the Evidence

Intergovernmental transfers have often been studied as equity and efficiency achieving instruments. There is an excellent review of this literature in Oates (1999). Some examples of solutions provided by intergovernmental transfers include: the internalization of externalities associated with inter-jurisdictional spillovers, the reduction of inefficient local revenue raising, and the provision of comparable living standards across jurisdictions within a federation[4]. However, the emergence of arguments from the public choice, and more recently political economy perspective have drawn attention away from the purely normative roles of transfers mentioned above.

[3]See for example Milligan and Smart (2005).

[4]In addition to these general treatment of the traditional approach, much insight has been provided on the optimal design of intergovernmental transfer systems. As we are concerned with discretionary transfers, we will not spend time on reviewing this literature here, rather interested readers are encouraged again to consult Oates (1999).

Insights have emerged from the literature on the positive role of intergovernmental transfers, both theoretically and empirically. Theoretically intergovernmental transfers have been addressed in studies of political redistribution, or *pork* as it is often referred to in the literature. The *pork* literature, of which intergovernmental transfers can be thought of as a special case, can be divided into those who find that politicians allocate resources to *swing voters* and those who allocate resources to *core supporters*. Prominent examples of the *swing voters* view include Lindbeck and Weibull (1987), Dixit and Londregan (1998); while representative of the *core supporters* hypothesis is Cox and McCubbins (1986), and Rodden and Wibbles (2005). Cox (2006) provides a survey of the empirical literature testing each hypothesis, suggesting that the verdict is very much still out on which, if either, hypothesis is correct[5].

Some recent papers in economics view the direction of transfers to be determined by political credit claiming concerns. Arulampalam, Dasgupta, Dhillion and Dutta (2008) studies a situation where voters have preferences for the political ideology of candidates and the intergovernmental grants received by their state governments, but are unable to determine which level of government deserves the credit for the grants. As state and central levels of government are controlled by either the same (aligned) or different (unaligned) parties with each level of government receiving only partial credit for the grants, the central governing party allocates more grants to states that are also governed by them so as to claim full credit for the grants. The model is tested on data from Indian states, and this feature is confirmed. Sole-Olle and Sorribas-Navarro (2008) uses a very similar model, but where parties do not care for any considerations other than their re-election. Still the same prediction arises in this credit claiming environment and their results are confirmed by Spanish data on central to province, province to local, as well as central to local transfers. Additionally Khemani (2007) studies the political determination of intergovernmental transfers exploiting exogenous variation in the politicization of a grant distribution program finding that partisanship does influence the direction of political transfers.

Papers that address the conflict of interest between voters and their elected represen-

[5]Empirical evidence in favor of the *core supporters* hypothesis, can be found in: Ansolabehere and Snyder (2003), and Levitt and Snyder (1995) among others. Representative empirical investigations in support of the *swing voters* hypothesis include Case (2001), and Dahlberg and Johansson (2002)

tatives do so in an agency framework. Persson and Tabellini (2000) and Besley (2006) present an overview of many of the workhorse models used in this field. Barro (1973) and Ferejohn (1986) are pioneering texts on the agency based view of electoral competition. Rogoff (1990) and a string of other empirical papers find strong evidence that political actors respond to voters when retaining office matters, and to their own self interests otherwise. Reid (1994) finds evidence from Canada that intergovernmental transfers are not exempted from the political budget cycle. Likewise Besley and Case (1995) and Lidborn-Peters (2003) have found evidence that politicians react to re-election concerns.

Two recent working papers address the vertical interactions of political agents in the above framework. Reich (2008) studies the effects of exogenous federal transfer schemes on political accountability at the local level in a model of adverse selection. Reich finds that transfers influence the re-election rates of incumbents differently depending on the extent of regional income inequality. As there is no strategic central government, this is a two period two region model of exogenous horizontal transfers. Joanis (2007) studies effect of dual provision of public goods on political accountability in a model of adverse selection when voters are uninformed about the contributions of each level to the public good. Joanis finds ambiguous results when considering the welfare comparisons in a move from a completely centralized or decentralized system of public good provision to one of partial decentralization as the complementarities of public good provision are traded off against a loss of information, and therefore political accountability.

These papers do not study the dynamics of both the levels and directions of intergovernmental transfers as they interact with the political system and political agents. Those papers investigating intergovernmental grants do not incorporate government actors who are separately elected individuals. This is an important aspect of federations as empirically many do not have the same political parties at both the central and federal levels (see Chibber and Kollman (2004)), and those that do not have separate independent elections of regional and central politicians perform poorly in terms of growth, accountability and corruption (Enikolopov and Zhuravskaya (2006)). In the following section we present a model with elected political agents who determine the levels and timing of intergovernmental transfers.

3 Model

The model presented builds on a basic career concerns model found in Persson and Tabellini (2000)[6]. There is a local and central government, each controlled by a self interested politician. Politicians value the rents obtained from office, and seek to hold office for a limit of two terms. While in office these politicians decide the level of rents to enjoy, transfers if any, and the amount of pubic goods to provide. When seeking re-election these politicians actively behave in the voters' interest in an attempt to maintain their hold on office. However, when not seeking re-election these politicians are unfettered in their satisfaction of their own desires. Thus, in the off-election periods we refer to these politicians with a term that reflects their image from the point of view of the voters: a *lame duck*.

3.1 Preferences

Consider a unit mass of homogenous, infinitely lived voters, who reside under the authority of two levels of government indexed by $j \in \{c, l\}$. These voters have preferences for public goods. We assume that voters are myopic, looking ahead one period, or half a term[7]. Voters in locality l care for the current levels of public goods provided in their locality by both the local (g_l) and central (g_c) levels of government, and a consumption good c. Voters are endowed with y_l units of income which is allocated to a consumption good and taxes; $c_l = y_l - \tau_l - \tau_c$. Voters are risk neutral and have per-period preferences defined as:

$$U_l = g_l + g_c + c_l \tag{1}$$

Politicians care for the rents from office. These rents are of two varieties. Physical resources can be allocated from the government's public budget to the desired private uses of the incumbent. We denote this by r. Also incumbent politicians may attain

[6]Itself influenced by Holmstrom (1982).

[7]Voter myopia is not necessary, but it simplifies the exposition dramatically by avoiding the additional disincentive that voters have for re-electing incumbents (they are lame ducks). In addition, because voters recognize the electoral externalities generated by their portfolio of office holders, having voters look more than one period ahead, doubles the state space over which they form their expectation of future utility.

a purely emotional or ego rent from attaining office, R. We state the per period preferences of a politician in office j in state s as:

$$V_j^s = v(r_j^s) + R_j^s \tag{2}$$

We assume that $v'(\cdot) > 0$ and $v''(\cdot) < 0$. Politicians have a maximum of two terms in office. We divide each term in office into two parts, the period following an election, (*post election*), and the period preceding an election (*pre-election*). In each of these four periods in office there is a publicly observed state of the world, s, which is a position on the electoral/re-electoral calendar. Politicians are either in their first term in office, Y (young) the term within which they seek re-election, or they are in their second term in office, O (old) in which they do not seek re-election because of binding term limits. The state of the world is a tuple, where the first character (upper case) denotes the term of the central incumbent and the second character (lower case) denotes the term of the local incumbent. The figures included display simultaneous and staggered electoral calendars, respectively. Each node in a figure represents the end point of a period, with a term composed of two periods.

In each period, each politician in either level of government, $j \in \{c, l\}$ provides a public good. These public goods have a linear technology using the total revenue raised by the the politician, any transfers received (T), and the politician's competence, less the rents appropriated, and transfers given. We assume that the taxes levied, $\{\tau_c, \tau_l\}$ are exogenous. The public good provided by a politician is augmented by the politician's competence. Formally,

$$g_l = \tau_l + T - r_l + \theta_l$$

$$g_c = \tau_c - T - r_c + \theta_c$$

Political competence, θ_j, is unobservable. In each period each politician receives a shock to their competence. The shock process is a moving average of order two. These shocks are independent and identically distributed, and uncorrelated with the state. The competence of an elected official is, $\theta_j = \mu_j' + \mu_j$ where the per period competence shocks are distributed with cdf $F_j(\mu_j)$, with mean 0 and variance σ_j^2. Primed variables denote the next period value.

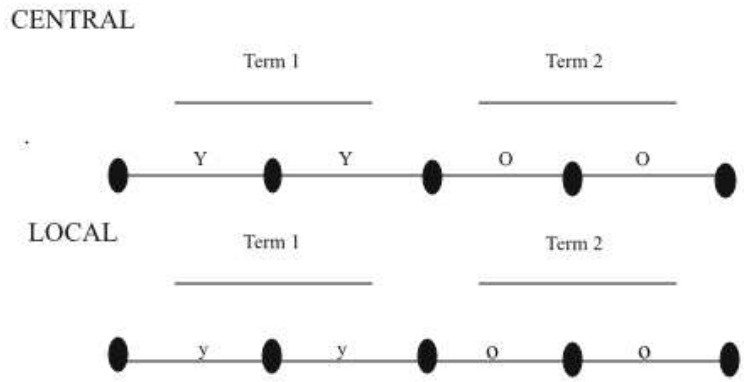

Figure 1: Simultaneous Electoral Calendar

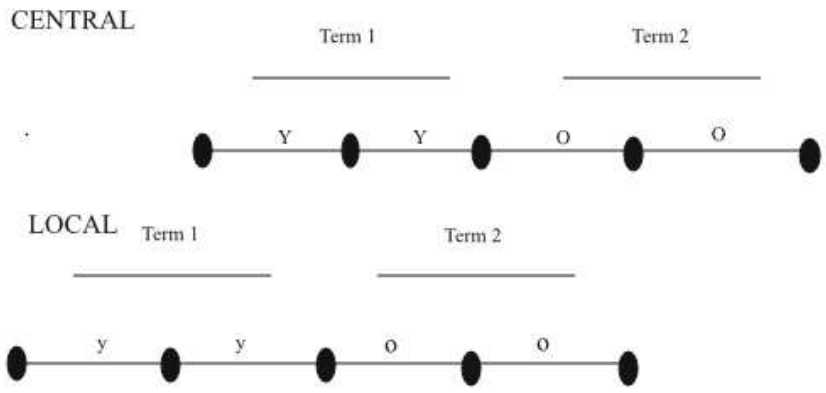

Figure 2: Staggered Electoral Calendar

We consider a game of imperfect information in which elections are staggered, such that election periods can occur within terms, but not simultaneously. When elections are staggered a central incumbent's post election period coincides with a local incumbent's pre-election period and vice versa. In each period the state is determined by the electoral outcomes of the last period. At the beginning of each period politicians receive a shock to their competence. Knowing only the state, and not their own competence, or the competence of the other office holder, politicians decide on the rents appropriated from office as well as transfers made to the budgets of other office holders. Together with competence θ_j, this decision residually determines the public goods provided. Voters then observe the public good allocations by each government and from this allocation and their knowledge of the previous state, they form an estimate of the current competence shock received by each office holder. If it is an election year at level $j \in \{c, l\}$, elections take place and voters then vote for the candidate whose electoral success is associated with the highest payoff to the voters. The outcome of the election is then observed, and the state is updated to reflect the post election allocation of politicians to office. A new period begins and the sequence of events is repeated. Politicians can hold office for a maximum of four periods (two terms). The per period timing is summarized below:

1. Given a state s, Nature draws competence shocks for each incumbent.
2. Incumbents from each office j, while not observing their competence, select this period's rents, r_j. The central incumbent selects transfers, T. Together these choices residually determine the levels of government spending from each office g_j.
3. Voters observe the provisions of public goods from each government and produce an estimate of the per-period competence shock μ_j for each politician.
4. Elections are held for an office $j \in \{l, c\}$. Voters vote and the outcome is observed.
5. The period ends, and state is updated given the outcome of the elections and a new period begins with Nature's move.

We focus on symmetric Markov perfect equilibria with incumbents and challengers choosing the same state contingent but history independent strategies.

We solve the above stage game by backwards induction. Incumbent politicians face a trade-off only when they are young. Old incumbents have no interest in re-election and so they always take the maximum feasible rents from office. The young politicians have the incentive to reduce rents to increase their re-election prospects by projecting a higher signal of their competence to the voters. This only matters in the preelection period of the young office holder's term, as it is only the last signal of competence that carries forward to effect the next period's public provision. Young politicians at the central level also face a trade-off in their first post election period in office. It is in this period that young central politicians have the ability to influence the electoral prospects of the current local incumbent through an intergovernmental transfer of resources. In any period other than that of their potential re-election, local recipients of said transfers would not spend them, rather they would employ these resources to increase their own rents. As we will show, if voters anticipate transfers from challengers, this is sufficient to motivate incumbents to allocate resources from their budget to that of a locality up for re-election.

Voters choose elected officials so as to maximize expected government expenditure. Competence increases the public good provision; therefore voters evaluate each politician on the basis of their competence, and the equilibrium payoffs associated with retaining an incumbent and selecting a challenger. Competence being a second order moving average of shocks, what voters wish is to re-elect an incumbent if and only if the current shock estimate exceeds the expected shock received by their challenger, which is zero, and any net benefits that may accrue from accepting a new office holder and influencing the state transition. Voters use the current estimate to infer the unknown future competence. Voters evaluate an incumbent office holder's competence by comparing the observed level of government expenditure, g_c or g_l, with the expected level of government expenditure, $\tilde{g_c} = \tilde{\tau_c} - \tilde{T} - \tilde{r_c}$ or $\tilde{g_l} = \tilde{\tau_l} + \tilde{T} - \tilde{r_l}$ respectively . This comparison yields an estimate of θ_j , $\hat{\theta}_j$. Voters use their current estimate of competence, $\hat{\theta}_j$, and their past estimate, $\hat{\theta_{j,-1}}$ to estimate $\hat{\mu_j}$. As μ_j is the durable component of competence, and therefore public good allocation, voters weigh this benefit of retaining an incumbent, with the equilibrium benefits of election a challenger. Any electoral de-

cision made by the voters has the ability to change the state, s (recall that the state of the world indicates whether both incumbents are young and facing re-election or not). Thus voters best response to the actions of an incumbent is described as a general election rule:

$$\text{reelect}_j(s) = \begin{cases} 1 & \text{if } \mu_j \geq \Pi_j^{s*} \\ 0 & otherwise \end{cases} \tag{3}$$

Where μ_j is the durable component of competence, θ_j, as accurately estimated by voters from previous expenditures. Π_j^{s*} is the net benefit from selecting a challenger for office j , in state s. If voters retain an incumbent by re-electing them, these incumbents are then old in the next period, facing no further re-election incentives to spend, therefore leaving as the sole gain from retention the durable component of their competence μ_j. This competence level must exceed any benefit accruing to voters from selecting a challenger, $\Pi_j^{s'*}$, which is determined in equilibrium. s' is a subset of $\{Yo, Yy, Oy, Oo\}$, depending on which office j is up for re-election.

Note that, old incumbents simply take maximal rents, $\overline{r_j}$ in both periods when old independently of the state or the voter's re-election rule[8]. Maximum rents are determined by the feasible set in that they cannot exceed the revenue raised by the government either through taxes or transfers. We can define the value of office for an old incumbent in office j as W_j:

$$W_j = ((1+\beta)v(\overline{r_j}) + R_j)$$

Thus we can concentrate on the strategies of the young incumbents. Young incumbents are in office in for two periods, their last being a pre-election period. Given the re-election rule employed by voters, incumbents seeking office maximize the value of office, which is their current enjoyment of rents plus their expected benefits from the retention of office. For the central incumbent this is characterized as:

$$\max_{r_c} v(r_c) + \beta \mathrm{E}[W_c] \tag{4}$$

The expectation is taken over the state, that is, their re-election prospect. Let $p_c = [1 - F_c(\tilde{\tau_c} - \tilde{T} - \tilde{r_c} - [\tau_c - T - r_c] + \Pi_c^{s'*})]$. This is the probability that a central incumbent

[8]This can be augmented by assuming that there are parties and that party discipline serves the role of ensuring that old incumbents do not take maximal rents, as the party has a longer horizon than the incumbents two terms of office.

is re-elected. Re-election occurs when the estimate of the current competence shock implies a benefit to voters that exceeds that associated with selecting a challenger, who would yield competence of $\mathrm{E}[\theta] = 0$, and a state dependent net benefit of $\Pi_c^{s'*}$, as determined in equilibrium. The first order condition for the incumbent is then given by:

$$\frac{\partial v(r_c)}{\partial r} - \beta f_c(\cdot) W_c = 0 \tag{5}$$

Similarly for a incumbent at the local level, the probability of their re-election is $p_l = [1 - F_l(\tilde{\tau}_l + \tilde{T} - \tilde{r}_l - [\tau_l + T - r_l] + \Pi_l^{s'*})]$, where again $\Pi_l^{s'*}$ is an equilibrium object. Facing re-election, a local incumbent's objective is to maximize their utility from office:

$$\max_{r_l} v(r_l) + \beta \mathrm{E}[W_l] \tag{6}$$

The incumbent trades off the utility from consuming the rents from office today with the cost of consuming those rents, the probability of being re-elected to enjoy the benefits of office again tomorrow. This yields a first order condition:

$$\frac{\partial v(r_l)}{\partial r} - \beta f_l(\cdot) W_l = 0 \tag{7}$$

Central incumbents have an opportunity to make transfers. In the pre-election period of their first term central politicians are concerned with their own re-election prospects. There are no transfers from or to old politicians, since donating old politicians derive no benefit from the transfer, and receiving old politicians would never spend the transfer, instead allocating the resources to their own private rent consumption. Therefore, with staggered elections central incumbents will only divert resources from their own rent consumption in state Yy, when both central and local incumbents are in their first term. Note that this diversion of resources will only take place in the period when local incumbents are actively seeking re-election, their pre-election period because they are already old if it is their post election period.

Now consider the central incumbent in the first period of their first term in office, with a young local incumbent seeking re-election. First, we know that the central government allocates no resources towards the public good, g_c, as they are not themselves seeking re-election and there is no informational spillover as each politicians' competence is

an independent process. Thus, all transfers come from a reduction in the central government's rent consumption.

$$\max_{T} v(\overline{r_c} - T) + \beta \mathrm{E}[\max_{r_c'} v(r_c^{s'}) + \beta p_c^{s'} W_c] \tag{8}$$

In this case the expectation again is taken over the future state; $s \in \{Yy, Yo\}$, however it is the local government's re-election prospects that are of importance to the central incumbent. If voters use a state dependent re-election rule, next period (pre-election) rent extraction by the central incumbent is state dependent as well as the central incumbent's own re-election prospects. Recall that in the post election period for the central incumbent their rents are always maximal so W_c is not state dependent. Thus the above yields a first order condition:

$$-\frac{\partial v(\overline{r_c} - T)}{\partial T} + \beta f_l(\cdot)[v(r_{c'}^{Yo*}) - v(r_{c'}^{Yy*}) + [p_{c,Yo} - p_{c,Yy}]W_c] = 0 \tag{9}$$

The term $[p_{c,Yo} - p_{c,Yy}]W_c$ represents the change in the re-election rule employed by voters as the state changes. This illustrates that the central incumbent's incentive to allocate transfers depends critically on the difference in the rents from office and re-election prospects in the two states Yo and Yy. While the disincentive to give transfers is the foregone rents today, the incentive to allocate transfers must be higher expected future benefits. These rents tomorrow are determined in equilibrium and we discuss these objects in detail below.

4 Equilibrium

We are interested in pure strategy, stationary, symmetric Markov perfect equilibria, where challengers are expected to take the same actions in equilibrium as incumbents and vice versa. The actions of both voters and politicians may be state dependent. An equilibrium is defined as:

Definition. *A Rational Expectations Political Equilibrium,* ***REPE****, is a pure strategy, symmetric, subgame perfect Nash equilibrium, consisting of a vector of state contingent actions by elected officials,* $\{r_l^{s*}, r_c^{s*}, T^{s*}\}$*, and (re-)election rules of voters* $\{reelect_{l,s}, reelect_{c,s}\}$ *such that: (i) each action by voters is a best response to those*

of incumbents, (ii) each action by incumbents is a best response to the actions of voters, (iii) each action in $\{r_l^{s*}, r_c^{s*}, T^{s*}\}$ *is equal to it's expected value* $\{\tilde{r_l^{s*}}, \tilde{r_c^{s*}}, \tilde{T_l^{s*}}\}$*, (iv) and actions are sequentially rational, given expectations.*

There are at least two **REPE**, in the game described above, one with no transfers, and the other with non-zero transfers. We describe each in detail below.

4.1 No transfer equilibrium

In the no transfer equilibrium, neither voters nor incumbents expect transfers from either the current central incumbent or the future central incumbent (the challenger). As the old incumbents always take maximal rents, the expected payoff from re-electing an incumbent at either level is given by the current period competence shock of the incumbent. This payoff must exceed the expected benefits from electing a challenger, who by definition is young and has expected competence of $\mathrm{E}[\theta] = 0$. In the no-transfer equilibrium, voters are expecting zero transfers from new incumbents, there is no state contingent surplus associated with a change from Yy to Yo or from Oy to Oo, shocks and elections are independent and each incumbent is evaluated independently by voters. As both new incumbents (challengers) and old incumbent do not differ in their first period actions (both take maximal rents) the state-transition specific surplus is $\Pi_j^* = 0$. The equilibrium re-election rule is simplified to:

$$\text{reelect}_j = \begin{cases} 1 & \text{if } \mu_j \geq 0 \\ 0 & otherwise \end{cases} \tag{10}$$

Given this, the pre-election period decisions for incumbents in both levels are identical:

$$\max_{r_j} v(r_j) + \beta \mathrm{E}[W_j] \quad j = c, l \tag{11}$$

The expectation is taken over the current competence as embedded in the voters re-election rule. In this case the probability of re-election is the probability that the current competence shock of an incumbent exceeds the expected value (zero), which is $p_j = [1 - F_j(\tilde{\tau_j} - \tilde{r_j} - [\tau_j - r_j])]$. The first order condition reads:

$$\frac{dv(r_j)}{dr_j} - \beta f_j(\cdot) W_j = 0 \tag{12}$$

As voters have rational expectations we have, $r_j^* \equiv \tilde{r_j}$. Define $h(r_j)$ as the inverse function of the marginal utility of rents $h(r_j) = \frac{dv}{dr_j}^{-1}$ giving the following equation defining the current period equilibrium rents:

$$r_j^* = h\left(\beta f_j(0) W_j\right) \tag{13}$$

Proposition 1. *There exists an* ***REPE*** *without transfers. The no-transfer equilibrium,* $\{r_l^{s*}, r_c^{s*}, T^{s*}, reelect_l^s, reelect_c^s\}$ *Is characterized by* $r_j^* = \overline{r_j} = \tilde{r_j}$ *in post-election periods,* $r_j^* = h\left(\beta f_j(0)[v(\overline{r_j}) + R_j']\right) = \tilde{r_j}$ *in pre-election periods, and* $T = \tilde{T} = 0$. *Voters re-elect incumbents on the basis of competence only and there is no incumbency advantage or disadvantage. Each incumbent seeking re-election is re-elected with probability* 0.5 *if the distribution is symmetric.*

In this equilibrium incumbents and challengers face equal chances of being reelected if the distribution is symmetric. With rents in the no transfer equilibrium described as above, we can describe the state specific government expenditures in each of the four periods under the staggered electoral calendar. In the post election period of either term g_j is equal to θ_j, the competence of the politician.

$$g_j = \begin{cases} \theta_j & \text{in the post election period of either term} \\ \tau_j - h\left(\beta f_j(0)[v(\overline{r_j}) + R_j']\right) + \theta_j & \text{in the pre-election period} \end{cases} \tag{14}$$

As elections are staggered, we can calculate the state dependent welfare of the representative voter when transfers are zero.

$$\text{Welfare}^{\neg T} = \begin{cases} \theta_l + \theta_c + c_l & \text{post-election } Oo,\, Yy \\ & \text{and pre-election } Oo, \\ \tau_c - h\left(\beta f_c(0)[v(\overline{r_c}) + R_c']\right) + \theta_c + \theta_l + c_l & \text{pre-election } Yo, Yy \\ \tau_l - h\left(\beta f_l(0)[v(\overline{r_l}) + R_l']\right) + \theta_l + \theta_c + c_l & \text{pre-election } Oy, Yy \end{cases} \tag{15}$$

While welfare differs in the different states, there is no reason for voters to change their reelection rule that is based on competence in pursuit of greater state specific welfare. The reason is that in the post-election periods each newly elected or re-elected official takes a period off of spending, enjoying the rents available to them through the budget.

4.2 Transfer Equilibrium

We now show that an equilibrium with positive transfers exists, wherein these transfers are anticipated by both voters and incumbent politicians in state Yy. The intuition of the transfer equilibrium is as follows. First, transfers from central to local governments only occur when both are in their first term of office, and when the local incumbent is facing re-election. In any other situation either: a) the central government is unwilling to make transfers because they are concerned with their own re-election (or because they are concerned with their own rent consumption (lame duck)) or b) local governments would spend transferred money on rents only. This last insight arises as local governments are not constrained from appropriating any resources made available to them. If transfers occur, local government spending increases and central government spending remains the same. Transfers come out of rents that would be consumed at the central level. Together this implies that voters benefit from a transfer. Finally, if voters expect transfers being made between two first term government officials, and prefer the state of the world in which both officials are in their first term, then voters will set higher re-election hurdles for governments when the transition to a state with transfers is possible. This makes getting re-elected more difficult. The central government's incentives are to avoid the state of the world where both central and local incumbents are in their first term in office (as this is the state where transfers take place).

We again begin with the voters who choose to re-elect the central incumbent according to a state contingent re-election rule. If the local government was re-elected the state is now Yo or Oo. As there is no re-election at the central level in state Oo, we first consider state Yy. In this case, regardless of what state voters find themselves in post election, they are faced with a situation in which local incumbents take the same action. Hence, voters base their decision on competence alone, and voter's re-election rule for the central incumbent is:

$$\text{reelect}_c = \begin{cases} 1 & \text{if } \mu_c \geq 0 \\ 0 & otherwise \end{cases} \tag{16}$$

If the local government was not re-elected, a new local challenger has taken office and the state is Yy. The re-election of a central government would involve a transition to

state Oy. However, if the central incumbent is not re-elected the state again becomes Yy, the state in which transfers among governments is expected. Formally we have:

$$\text{reelect}_c = \begin{cases} 1 & \text{if } \mu_c \geq \Pi_c^{Yy*} \\ 0 & otherwise \end{cases} \tag{17}$$

Where $\Pi_c^{Yy*} = g_c^{Yy*} + g_l^{Yy*} - (g_c^{Oy*} + g_l^{Oy*})$ is the difference in equilibrium public good levels across the two possible states. Note that the subsequent period is by definition a post election period for the central government. For this reason the central incumbent has no reason to provide public goods herself. It follows from the central government's budget constraint, $g_c = \tau_c - T - r_c + \theta_c$ that $g_c^{Yy*} = g_c^{Oy*} = \theta_c$. If transfers take place they come out of the central incumbent's rents. The next period is a re-election period for the local government in which the local budget constraint must bind. In state Yy this constraint is $g_l = \tau_l + \tilde{T} - r_l + \theta_l$, and in Oy we have $g_l = \tau_l - r_l + \theta_l$. Thus the expected difference between the public goods provided in each state is $\Pi_c^{Yy*} = g_l^{Yy*} - g_l^{Oy*}$, and the difference between these two levels of government expenditure at the local level is determined by the equilibrium transfer in state Yy and the expected difference in rents extracted by the local incumbent in each state:$\Pi_c^{Yy*} = \tilde{T} + (r_l^{\tilde{Oy}} - r_l^{\tilde{Yy}})$.We refer to Π_c^{Yy*} as the equilibrium electoral externality imposed upon the incumbent at the central level. This externality is the sum of the expected transfer allocated by a central challenger, and the difference between rent extraction by the local government in states Oy and Yy. This second term arises as local governments may respond to the received transfers.

Given the re-election rules employed by voters we can derive the optimal rent extraction for the central incumbent in each state. The central incumbent in state Yy solves:

$$\max_{r_c^{Yy}} v(r_c^{Yy}) + \beta \mathrm{E}[W_c] \tag{18}$$

The expectation is taken over the current competence as embedded in the voters re-election rule. In this case the probability of re-election is the probability that the current competence shock of an incumbent exceeds the expected competence of the challenger, zero, plus $\tilde{T}$ and electoral externality. We have this probability in the following form $p_c = [1 - F_c(\tilde{\tau_c} - \tilde{r_c} - [\tau_c - r_c] + \Pi_c^{Yy*})]$. In the period when the central incumbent faces re-election, transfers have already been made in the previous period,

and so the central incumbent chooses rent extraction to maximize their utility from office[9]. This yields a first order condition:

$$\frac{dv(r_c^{Yy})}{dr_c^{Yy}} - \beta f_c(\cdot) W_c = 0 \tag{19}$$

As voters have rational expectations we have, $r_j^{s*} \equiv \tilde{r_j^s}$ for all s and j. Again let $h(r_c)$ denote the inverse function of the marginal utility of rents $h(r_c) = \frac{dv}{dr_c}^{-1}$ giving the following equation defining the current period equilibrium rents:

$$r_c^{Yy*} = h\left(\beta f_c(\Pi_c^{Yy*}) W_c\right) \tag{20}$$

We can likewise solve for the incumbent's optimal rent consumption in state Yo. This program is identical to that of the non-transfer equilibrium and we have:

$$r_c^{Yo*} = h\left(\beta f_c(0) W_c\right) \tag{21}$$

Notice that rents extracted by the central incumbent may differ in states Yy and Yo depending on the properties of the distribution of competence.

The state the central government finds itself in depends on the outcome of the local government election. The local government's rent consumption is chosen optimally given the re-election rule employed by the voters for the local government election. Formally in state Yy we have:

$$\text{reelect}_l = \begin{cases} 1 & \text{if } \mu_l \geq \Pi_l^{Yy*} \\ 0 & otherwise \end{cases} \tag{22}$$

Where $\Pi_l^{Yy*} = g_c^{Yy*} + g_l^{Yy*} - (g_c^{Yo*} + g_l^{Yo*})$. Again, we can observe that post-election rents extracted by the local incumbent are maximal, $\overline{r_l}$. From the budget constraint of the local government we see that $g_l^{Yy} = g_l^{Yo} = \theta_l$. Any difference in public good provision in the period following a local government election will arise from differences in the public goods provided by the central government, as a period following a local election is a period prior to a central election. From the central government's budget constraint, given the expected value of competence is zero we have: $\Pi_l^{Yy*} = (r_c^{\tilde{Yo}} - r_c^{\tilde{Yy}})$,

[9]This is because transfers will not take place in the periods when voters evaluate the central incumbent as the resources are always better allocated towards their own re-election or their own rent consumption

as the difference in government expenditure at the central level. Thus in state Yy local governments solve the following program:

$$\max_{r_l^{Yy}} v(r_l^{Yy}) + \beta \mathrm{E}[W_l] \tag{23}$$

In this case the probability of re-election is the probability that the current competence shock of the local incumbent exceeds the expected competence of the challenger, zero, plus an electoral externality imposed by the change in behavior of the central incumbent when the state changes. This probability has the following form $p_l = [1 - F_l(\tilde{\tau}_l + \tilde{T} - \tilde{r}_l - [\tau_l + T - r_l] + \Pi_l^{Yy*})]$.

This yields a first order condition:

$$\frac{dv(r_l^{Yy})}{dr_l^{Yy}} - \beta f_l(\cdot) W_l = 0 \tag{24}$$

Again imposing rational expectations we have, $r_j^{s*} \equiv \tilde{r_j^s}$ for all s and j, and $T^* = \tilde{T}$. Using $h(r_l)$ we arrive at the following equation defining the current period equilibrium rents for the local incumbent as a function of the equilibrium electoral externality:

$$r_l^{Yy*} = h\left(\beta f_l(\Pi_l^{Yy*}) W_l\right) \tag{25}$$

The equilibrium electoral externality is a function of the rent extraction from the central level, and so this equilibrium rent function is the optimal rent extraction at the local level given the rent extraction at the central level.

We can likewise solve for the local incumbent's optimal rent consumption in the state Oy, when the central incumbent was re-elected. In this case the equilibrium electoral externality will be zero as second term central incumbents are lame ducks without re-election concerns and have no reason to give transfers to local incumbents. Thus in state Oy the sub-game for the local incumbent is identical to that in the non-transfer equilibrium and we have the same optimal rents as defined by:

$$r_l^{Oy*} = h\left(\beta f_l(0) W_l\right) \tag{26}$$

Again depending on the specific distribution for competence (an assumption on f'), rents for the local incumbent may differ in states Yy and Oy.

Finally we can solve for the central incumbent politician's transfer to the young local politician. The central government makes a transfer to influence the electoral outcome of the local government election. They desire to do so to increase the probability that the local incumbent is re-elected. When the local incumbent has been re-elected the central incumbent finds herself in the most favorable state, where both their own rents and their future re-election prospects are highest. Thus, in state Yy the transfer is chosen as that which maximizes the utility of the central incumbent. Again letting W denote the continuation payoff for a central incumbent conditional on a win in their election, in state Yy we have the central incumbent's post-election problem:

$$\max_{T} v(\overline{r_c} - T) + \beta \mathrm{E}[\max_{r_c} v(r_c(s')) + \beta W_j] \tag{27}$$

In this case the expectation again is taken over the state, however it is the local government's re-election prospects that are of importance to the central incumbent when choosing the transfer, as the transfer affects the probability of changing the state in which the central incumbent is re-elected:$p_l = [1 - F_l(\tilde{\tau}_l + \tilde{T} - \tilde{r}_l - [\tau_l + T - r_l] + \Pi_l^{Yy*})]$. In the event that the local incumbent is not re-elected ,the central incumbent's next period rents and re-election prospects are lower and this occurs with probability $1 - p_l$. This yields a first order condition:

$$-\frac{\partial v(\overline{r_c} - T)}{\partial T} + \beta f_l(\Pi_l^{Yy*}) \left([v(r_c^{Yo*}) - v(r_c^{Yy*})] + \beta [F_c(\Pi_c^{Yy*}) - F_c(0)] W_c \right) = 0 \tag{28}$$

Imposing the condition that expectations of actions are equal to their equilibrium values, and making use of the $h(\cdot)$ function defined above, the equilibrium transfers are the fixed point that satisfies:

$$T^* = \overline{r_c} - h\left(\beta f_l(\Pi_l^{Yy*}) \left([v(r_c^{Yo*}) - v(r_c^{Yy*})] + \beta [F_c(T^* + (r_l^{\tilde{O}y} - r_l^{\tilde{Y}y})) - F_c(0)] W_c \right) \right) \tag{29}$$

We can show that there exists a T^* strictly greater than 0 that satisfies the above condition.

Lemma 1. *There exists a value of T on the interval $(0, \overline{r_c}]$ that satisfies $T^* = \overline{r_c} - h\left(\beta f_l(\Pi_l^{Yy*}) \left([v(r_c^{Yo*}) - v(r_c^{Yy*})] + \beta [F_c(T^* + (r_l^{\tilde{O}y} - r_l^{\tilde{Y}y})) - F_c(0)] W_c \right) \right)$.*

Proof. $h\left(\beta f_l(\Pi_l^{Yy*}) \left([v(r_c^{Yo*}) - v(r_c^{Yy*})] + \beta [F_c(T^* + (r_l^{\tilde{O}y} - r_l^{\tilde{Y}y})) - F_c(0)] W_c \right) \right)$ is a continuous strictly decreasing function on the entire domain of T, and therefore also on

any sub interval thereof, including $(0, \overline{r_c}]$. This is shown as the argument on which $h(\cdot)$ is evaluated must be non-decreasing in T in equilibrium. A fixed point exists where this decreasing function is equal to $\overline{r_c} - T^*$, also a decreasing function of T. For an equilibrium these two curves must intersect on the interval $(0, \overline{r_c}]$. □

For simplicity assume that the distribution functions for the local and central politicians' competence shocks are identical: $F_c(\cdot) = F_l(\cdot) = F(\cdot)$[10].

We can summarize the requirements of the pure strategy symmetric Markov perfect equilibrium of the game described above. All expected actions are equal to their equilibrium values, and these equilibrium values are the dominant strategies for each player given those taken by every other player. While the stage game is repeated, the players themselves play for a finite number of periods, thus we simply need to solve each stage game by backwards induction. These optimal strategies are determined by the conditions listed below.

Voting in each election is optimal given the state transition payoffs, and estimated competence:

$$\text{reelect}_c^{Yy} = \begin{cases} 1 & \text{if } \mu_c \geq \Pi_c^{Yy} \\ 0 & otherwise \end{cases} \tag{30}$$

$$\text{reelect}_l^{Yy} = \begin{cases} 1 & \text{if } \mu_l \geq \Pi_l^{Yy} \\ 0 & otherwise \end{cases} \tag{31}$$

$$\text{reelect}_j^{s} = \begin{cases} 1 & \text{if } \mu_j \geq \Pi_j^{s} \text{ if } s \in \{Yo, Oy\} \\ 0 & otherwise \end{cases} \tag{32}$$

Central incumbent's rent extraction satisfies:

$$\tilde{r_c^s} = r_c^s = \begin{cases} h\left(\beta f_c(\Pi_c^{Yy}) W_c\right) & \text{if } s = Yy \\ h\left(\beta f_c(0) W_c\right) & \text{if } s \neq Yy \end{cases} \tag{33}$$

Local incumbent's rent extraction satisfies:

$$\tilde{r_l^s} = r_l^s = \begin{cases} h\left(\beta f_c(\Pi_l^{Yy}) W_l\right) & \text{if } s = Yy \\ h\left(\beta f_c(0) W_c\right) & \text{if } s \neq Yy \end{cases} \tag{34}$$

[10]This assumption can easily be relaxed, particularly when one wishes to make the natural assumption that $F_c(x) \leq F_l(x)$ for all x, i.e. that F_c first order stochastically dominates F_l. This may be the case, if in order to run in the national competition some screening process is present that is absent at the local level.

Finally the central incumbent's transfer decision satisfies $T^s = \tilde{T^s}$. When $s \neq Yy$, then $\tilde{T^s} = 0$. However when $s = Yy$ we have the following:

$$\tilde{T^s} = \overline{r_c} - h\left(\beta f_l(\cdot)\left([v(r_c^{Yo*}) - v(r_c^{Yy*})] + \beta[F_c(\tilde{T} + (r_l^{\tilde{O}y} - r_l^{\tilde{Y}y})) - F_c(0)]W_c\right)\right) \quad (35)$$

Proposition 2. *There exists an **REPE** with positive transfers whenever either of the following conditions is satisfied:*

i) $f' = 0 \ \forall \ \mu \ \in [\mu_{min}, \mu_{max}]$

ii) $f' > 0$ *for* $\mu \ \in [-\epsilon, \epsilon]$, $1 >> \epsilon > 0$

iii) $f' < 0$ *for* $\mu \ \in [-\epsilon, \epsilon]$, $1 >> \epsilon > 0$, $T* > |r_l^{Oy*} - r_l^{Yy*}|$, $\beta[F(T + r_l^{Oy*} - r_l^{Yy*}) - F(0)]W_c > |v(r_c^{Yo*}) - v(r_c^{Yy*})|$

In the transfer equilibrium, $\{r_l^{s*}, r_c^{s*}, T^{s*}, reelect_l^s, reelect_c^s\}$ *is characterized by* $T = \tilde{T}$, $r_j^* = \overline{r_j} = \tilde{r_j}$ *in post-election periods, and* $r_j^{s*} = h\left(\beta f_j(0)W_j\right) = \tilde{r_j^s}$ *in pre-election periods when either of the office holders in not young,* $s \in Oy, Yo$. *When the state is* Yy *we have* $r_l^{Yy*} = h\left(\beta f_l(r_c^{\tilde{Y}y} - r_c^{\tilde{Y}o})W_l\right) = r_l^{\tilde{Y}y}$, *and* $r_c^{Yy*} = h\left(\beta f_c(E[T^*] + (r_{l,\tilde{Oy}} - r_{l,\tilde{Yy}}))W_c\right) = r_c^{\tilde{Y}y}$. *Voters re-elect incumbents on the basis of competence and the electoral externality presented by the state contingent actions of the other office holder.*

Proof. Case (i): When $f' = 0$, μ is a uniformly distributed random variable on an interval $\{\mu_{min}, \mu_{max}\}$. Imposing the equilibrium condition that expected values equal their anticipated values ensures that conditions (31)-(36) are satisfied. In particular the dominant strategy for the central incumbent is to set $r_c^{Yo*} = h\left(\beta \frac{1}{\mu_{max} - \mu_{min}} W_c\right) = r_c^{Yy*}$ in pre-election periods and $\overline{r_c}$ in all post election periods. Similarly the local incumbent's optimal strategy is to set $r_l^{Yo*} = h\left(\beta \frac{1}{\mu_{max} - \mu_{min}} W_l\right) = r_l^{Yy*}$ in pre-election periods and $\overline{r_l}$ in all post election periods. The equilibrium payoff to voters from choosing the challenger at a central election when both incumbents are young is $\Pi_c^{Yy} = T$ and at the local election we have $\Pi_l^{Yy} = 0$. Thus voters re-elect the central incumbent only if the payoff from doing so exceeds the payoff associated with the challenger: $\mu_c > T^*$. Likewise voters re-elect the local incumbent only if $\mu_l > 0$. T^* is the fixed

point that satisfies lemma 1, which is positive in state Yy given W_c is large enough.
Case (ii): Consider[11] $f' > 0$ in the interval $[0, b]$ where $b = T + r_l^{Oy} - r_l^{Yy}$. Again, all players are playing optimal strategies, and conditions (31)-(36) are satisfied. In this case $r_c^{Yo*} = h(\beta f_c(0)W_c) > r_c^{Yy*} = h\left(\beta f(T + r_l^{Oy} - r_l^{Yy})W_c\right)$ in pre-election periods and $\overline{r_c}$ in all post election periods. Similarly $r_l^{Yo*} = h(\beta f(0)W_l) > r_l^{Yy*} = h\left(\beta f(r_c^{Yo} - r_l^{Yy})W_l\right)$ in pre-election periods and $\overline{r_l}$ in all post election periods. The equilibrium payoff to voters from choosing the challenger at a central election when both incumbents are young is $\Pi_c^{Yy} = T + r_l^{Oy} - r_l^{Yy}$ and at the local election we have $\Pi_l^{Yy} = r_c^{Yo} - r_l^{Yy}$. Thus voters re-elect the central incumbent only if $\mu_c > T + r_l^{Oy} - r_l^{Yy}$ and re-elect the local incumbent only if $\mu_l > r_c^{Yo} - r_l^{Yy}$. T^* is the fixed point that satisfies lemma 1.
Case (iii): Consider $f' < 0$ in the interval $[0, b]$ where $b = T + r_l^{Oy} - r_l^{Yy}$[12]. Again, all players are playing dominant strategies, and conditions (31)-(36) are satisfied. In this case $r_c^{Yo*} = h(\beta f_c(0)W_c) < r_c^{Yy*} = h\left(\beta f(T + r_l^{Oy} - r_l^{Yy})W_c\right)$ in pre-election periods and $\overline{r_c}$ in all post election periods. Similarly $r_l^{Yo*} = h(\beta f(0)W_l) < r_l^{Yy*} = h\left(\beta f(r_c^{Yo} - r_l^{Yy})W_l\right)$ in pre-election periods and $\overline{r_l}$ in all post election periods. The equilibrium payoff to voters from choosing the challenger at a central election when both incumbents are young is $\Pi_c^{Yy} = T + r_l^{Oy} - r_l^{Yy}$ and at the local election we have $\Pi_l^{Yy} = r_c^{Yo} - r_c^{Yy}$ which in this case is negative. Thus voters re-elect the central incumbent only if $\mu_c > T + r_l^{Oy} - r_l^{Yy}$ and re-elect the local incumbent only if $\mu_l > r_c^{Yo} - r_l^{Yy}$. T^* is the fixed point that satisfies lemma 1. This is an equilibrium whenever: the equilibrium benefit from electing a challenger is greater than 0, $T* > |r_l^{Oy*} - r_l^{Yy*}|$, and the payoff to the incumbent from the local incumbent's re-election in state Yy is greater than the difference in the utility loss from rents associated in state Yy and Yo; $\beta[F(T + r_l^{Oy*} - r_l^{Yy*}) - F(0)]W_c > |v(r_c^{Yo*}) - v(r_c^{Yy*})|$. □

The above shows that we have an equilibrium with transfers, however it is dependent on the distribution of competence. The reason for this dependence is that in an equilibrium with transfers there is always an incentive for the incumbent to avoid the state in which a challenger has an advantage of being able to provide a transfer, however depending on how the wedge created by the transfer affects the probability of being re-elected

[11]This will be true for some negatively skewed distributions.
[12]This will be true for all symmetric and some positively skewed distributions.

on the margin, rents selected may be higher or lower in this state. To see how the structure of the equilibrium operates in the absence of the electoral externalities let us focus on an example when the competence shocks are distributed uniformly.

Example 1. *Consider the following distribution for competence* $\mu \sim U[-\frac{\phi}{2}, \frac{\phi}{2}]$ *and a logarithmic functional form for the incumbent's preferences for rents. The timing is as stated above. Equilibrium rents chosen are the same in each state with the central incumbent selecting* $r_c^{Yo*} = r_c^{Yy*} = \frac{\phi}{\beta W_c}$ *and the local incumbent selecting* $r_l^{Oy*} = r_l^{Yy*} = \frac{\phi}{\beta W_l}$*. The transfers from the first stage are given by:*

$$T^* = \overline{r_c} - h\left(\beta f_l(\Pi_l^{Yy*})\left([v(r_c^{Yo*}) - v(r_c^{Yy*})] + \beta[F_c(T^* + (r_l^{\tilde{O}y} - r_l^{\tilde{Y}y})) - F_c(0)]W_c\right)\right)$$

With logarithmic preferences this simplifies to:

$$T = \overline{r_c} - \frac{1}{\beta\frac{1}{\phi}\left(\beta[\frac{T-\frac{\phi}{2}}{\phi} - \frac{1}{2}]W_c\right)}$$

Rearranging we can solve for T^**:*

$$T^* = \frac{\frac{\beta^2 W_c}{\phi} + \frac{\beta^2 W_c \overline{r_c}}{\phi^2} \pm \sqrt{(\frac{\beta^2 W_c}{\phi} + \frac{\beta^2 W_c \overline{r_c}}{\phi^2})^2 + 4(\frac{\beta^2 W_c}{\phi^2})(\frac{\beta^2 W_c \overline{r_c}}{\phi} - 1)}}{2\frac{\beta^2 W_c}{\phi^2}}$$

This T^* *is has two real roots when* $\phi^2(\beta^4 W_c^2 + 4\beta^2 W_c) + \beta^4 W_c^2 \overline{r_c} > \phi 2\beta^4 W_c^2 \overline{r_c}$
If $\beta = 0.5$*,* $\phi = 4$*,* $W_c = 100$*, and* $\overline{r_c} = 10$ *we have:*

$$T^* = \frac{21.88 \pm 13.28}{3.13} = 11.23 \text{ or } 2.75$$

Clearly the first root is not feasible as it exceeds the budget, so the equilibrium value of T^* *is 2.75.*
In this equilibrium, the re-election rates are 0.5 *in all states but* Yy*, when the equilibrium re-election rate is:*

$$\frac{T^* - 2}{4} = \frac{2.75 - 2}{4} = \frac{0.75}{4} = \frac{3}{16}$$

It is this state Yy *which the central incumbents wish to avoid by allocating the transfer to the local incumbent.*

From this example we see that local incumbents are no better off in this equilibrium as their rents and re-election rates are identical to that in the equilibrium without transfers. When comparing the utility of central incumbents in the equilibria with and without transfers it is clear that central incumbents would prefer the equilibrium without transfers, but conditional on the expectation of transfers their utility is increasing in the transfer. Voters are the real winners with transfers as these funds are diverted from their only other use: rents. Public good spending therefore increases in the state when transfers take place and voters have higher welfare due to the increased electoral competition invoked by the expectation of transfers. In general we can state the following corollary:

Corollary. *Voter welfare in an equilibrium with transfers is higher whenever* $f' \geq 0$ *on the interval* $[0, T + r_l^{Oy} - r_l^{Yy}]$. *For* $f' < 0$ *on the interval* $[0, T + r_l^{Oy} - r_l^{Yy}]$, *welfare is higher whenever* $(r_c^{Yy} - r_c^{Yo})F(r_c^{Yo} - r_c^{Yy}) < T$.

Recall that the utility of a voter is their consumption of government expenditures, and the private consumption good. We will write this for each state:

$$\text{Welfare}^T = \begin{cases} \theta_l + \tau_l + \theta_c - r_l^{Yy*} + c_l + T & \text{local pre-election } Yy, \\ \theta_l + \tau_c + \theta_c - r_c^{Yy*} + c_l & \text{central pre-election } Yy, \\ \theta_l + \tau_c + \theta_c - r_c^{Yo*} + c_l & \text{central pre-election } Yo, \\ \theta_l + \tau_l + \theta_c - r_l^{Oy*} + c_l & \text{local pre-election } Oy, \\ \theta_l + \theta_c + c_l & \text{all other periods } Oo, Yo, Oy, \end{cases} \tag{36}$$

Notice that the welfare of voters is strictly higher in state Yy as a result of the transfer when rents are lower in the transfer equilibrium, i.e. $f' \geq 0$. However when rents are higher as a result of the transfer, $f' < 0$, voters are better off in the local pre-election period when both incumbents are young as a result of the transfer, but worse off in the central pre-election period as central rents are higher in the transfer equilibrium in this case.

In the equilibrium with transfers re-election prospects are strictly lower for both levels of government due to the presence of an electoral externality. Voters no longer concern themselves with competence only, and also replace incumbents when it involves a change to a challenger who is more likely to allocate transfers to them. In addition to this, the utility of the central incumbents is also lower, as the transfer itself

involves foregoing rents that would otherwise be allocated to the incumbent's private rent consumption. Notice however that the rent consumption depends on the state of the world, and the distribution function so in some states, politicians at the central level are no worse off and local incumbents may in fact be better off. Nevertheless we can state the following.

Corollary. *Central incumbent utility in an equilibrium with transfers does not exceed central incumbent utility in an equilibrium without transfers. Local incumbent utility in the equilibrium with transfers may be less than, greater than or equal to that of the equilibrium without transfers.*

Local incumbents react to the transfer by the reallocation of rents. In cases when $f' \leq 0$ local incumbents are no worse off when the central government allocates transfers, however if $f' > 0$ rent extraction decreases in the period in which they receive transfers as voters anticipate higher rents from the central incumbent if the local incumbent is re-elected.

Average competence at the central level is also lower, as voters take more draws from the distribution of politicians, but keep less of those whose competence is greater than the mean when incumbent politicians are held to a higher standard. This negative effect for voters is offset by the transfers themselves. At the local level average competence may be less than, greater than or equal to it's value in the equilibrium without transfers.

Proposition 3. *Average competence at the central level in the equilibrium with transfers is strictly lower than average competence in the equilibrium without transfers. Average competence at the local level in the equilibrium with transfers does not exceed that of the equilibrium without transfers.*

Proof. The average competence without elections is equal to the expected value of the competence shocks: $\mathrm{E}[\theta_j] = 2\mathrm{E}[\mu] = 0$. Elections serve to retain politicians whose competence is above some threshold. Without transfers this threshold at both levels is the average $\mu = 0$ and so we have:

$$\mathrm{E}[\theta_c] = \int_0^{\mu_{max}} \mu dF(\mu)$$

When in a transfer equilibrium at the central level we have:

$$\mathrm{E}[\theta_c] = \int_{\Pi_c^{Yy}}^{\mu_{max}} \eta dF(\mu)$$

Which is less than the above whenever $\Pi_c^{Yy} > 0$, which is true when transfers occur. Similarly for the local election we have:

$$\mathrm{E}[\theta_l] = \int_{\Pi_l^{Yy}}^{\mu_{max}} \eta dF(\mu)$$

However note that depending on the curvature of the distribution function, as in cases of proposition 2, Π_l^{Yy} may be greater, less than, or equal to zero depending on the curvature of the distribution of competence. Notice that the only instance when the interval over which we integrate increases is that when Π_l^{Yy} is negative, thus decreasing the average competence. □

5 Discussion

In an equilibrium with transfers, incumbent governments exert electoral externalities on each other depending on their tenure in office. These electoral externalities arise because transfers unambiguously increase public spending, distorting the electoral choice of voters. Without transfers the sole issue at the ballot box is the competence of the candidates. With transfers voters not only evaluate politicians on the basis of their competence, but also on the expected transfer received when this politician is in office. Transfers take place when both central and local politicians are in their first term. Voters therefore prefer a central-local pair of incumbents that will generate transfers. This presents electoral externalities that in equilibrium will affect the rent selection activity of both central and local governments, if it also affects the probability of re-election on the margin.

A transfer equilibrium does not require that a central incumbent has an intrinsic preference for a particular office holder at the local level. This is an interesting insight of the model. What is required is that both the central incumbent and the voters expect that a challenger will give a transfer to a local government should the local challenger be elected. Thus the essence of the model is that by making a transfer, the incumbent

increases their own re-election prospects by sabotaging their future challenger. This allowed us to discuss the effect of transfers on political accountability in the absence of parties.

It would be interesting to introduce parties into this framework. Notice that this model requires that only one party can commit to the allocation of transfers in order for a transfer equilibrium to emerge where both parties give transfers in pre-election periods. This can explain discretionary intergovernmental transfers in systems where distinctly different parties operate on the national and local levels. Chhibber and Kollman (2004) study the presence of national parties in federations, showing that there is variation across countries and time in the prevalence of the same parties operating at both the national and sub-national levels. The ability for purely partisan based discretionary transfers to take place requires as a pre-requisite that the same parties operate at both levels of government, something which is not true in general, particularly for municipal politics, much of which involves non-partisan electoral competition.

That the transfer equilibrium involves higher voter welfare, than the equilibrium in the absence of transfers requires further comment. Previous research has established that transfers are good for recipients, but bad in general. In this model there is no segmentation at the sub-central level, the single local government is the only local government and there is no rivalry of the transfer. Incorporating multiple regions into this framework would allow for such a feature[13]. Enikolopov and Zhuravskaya (2007) show that those countries that have decentralized authority and resources to more local levels of government perform better when national parties are strong, as strong national parties can create an incentive for career concerned politicians to refrain from misallocating centrally collected revenues that are directed to their authoritative control. The model in our paper can be augmented to incorporate political ambitions of the local governments, if central politicians desire to select their successors from a pool of locally elected politicians. This would require immutable characteristics of politicians, which is outside the scope of the current paper as well as a formal statement of why central governments would operate in this way. We will not discuss this point

[13]However doing so would require augmenting the model of political competition to one in which both the incumbent and challenger play a more active role in each election. One suggested manner of incorporating this feature is the introduction of uninformed voters, who vote for parties.

further, but to state only that the incentive for an incumbent to make a transfer when one is expected of the challenger in a particular state of the world will remain a partial incentive for transfers in a model of electoral competition with forward looking voters.

This model produces multiple equilibria, raising two important questions regarding the insights arrived at from this research. The first is how would an equilibrium with transfers arise? And the second is which equilibrium would we expect to be selected. The answer to the former rests in the main feature of the environment; voters forecast the expected rents delivered by a challenger. If national parties enter the local arena or local parties enter the national arena we should expect that they can credibly claim to deliver transfers if elected. One party with this ability is enough to generate the equilibrium. This means that even if there is no intrinsic reason for an incumbent to transfer resources to their sub-national counterpart, the expectation that their challenger will do so is sufficient to generate a transfer equilibrium. This assumption is surely the weakest one can make to support an equilibrium with transfers.

As for the selection of such an equilibrium, we can see one striking reason we would expect to coordination on the equilibrium without transfers. Since it is the politicians who are worse off in the equilibrium with transfers, if politicians could create an institution that allowed them to coordinate with voters on the no transfer equilibrium, they would like to do so. One such coordination device would be to eliminate the possibility of transfers in the constitution. Such an action may be politically unpopular among voters, but popular among all politicians. Indeed this work may shed light on why would would expect to see self interested politicians commit to instituting formulaic grant programs in much of the world. Rarely do we see such practices of "tying ones' hands" unless it is expected to benefit the policy makers themselves.

Relaxing the assumption of myopic voting would complicate things, but the above intuition would still hold. If voters look ahead two periods, a full term, when making their re-election decision, their re-election rules in both the equilibrium with transfers and without changes as voters raise the bar on incumbents, only keeping those whose competence is high enough to off-set the difference between having a lame duck in office and having a young incumbent who will spend. This would lead to a further reduction, or increase in rents depending on the curvature of the distribution function.

The complication arises as a full term for one office holder, corresponds with one half term for the other office holder and so in this environment with staggered elections one must consider the effect of a current electoral decision on the future electoral decisions. This third order contagion across elections at different levels over time would add little, particularly as it introduces another level of uncertainty.

Again, while our approach here is without the assumption that transfers are intrinsically valued by politicians, or flow in particular ways ex ante, it is not without application to such environments. In fact, if parties existed whereby transfers followed a partisan line we would see a similar equilibrium wherein voters pay some attention to partisan matching and somewhat less to competence. However, even with the intention of partisan matching, parties must themselves commit to a flow of transfers, something which becomes increasingly difficult when one considers the coordination required among regions to change a national government.

It is the coarseness of the voters' actions which forces the transfer equilibrium to have such stark properties. Voters can only make one choice with their ballot, and if transfers increase their welfare, then surely they will be pursued at the expense of political competence. It is this raising of the bar that makes politicians worse off, but they are unable to avoid its implications and thus themselves give transfers to affect their own re-election prospects.

Two things this paper does not address are: partisan motivated transfers, and simultaneous election dates. When parties matter for transfers researchers often begin with a statement about the alignment between local and central political party preferences. If one wished to introduce such a motivation in this environment we conjecture that the results would intuitively still apply, however one must then assert whether politicians use transfers to target supporters or swing voters, and at which level of partisanship, if we allow voters to split their ticket. The strength of either assumption in such an environment reduces the insight attainable from the research. In a partisan environment transfers may not be made to effect re-election prospects explicitly. It is quite likely that these transfers serve a role of attaining partisan discipline. Future work modeling the internal organization of party structures and how parties overcome a lack of political commitment should prove a fruitful endeavor.

6 Conclusion

This paper studies intergovernmental transfers in a model with rational voters and politicians. We find that an equilibrium exists where central incumbents make transfers to local governments in order to favorably effect their own re-election prospects and rent consumption. This work displays how the structure associated with the electoral calendar itself can generate an equilibrium with intergovernmental transfers. While no parties exist in the model the results generated persist once one extends the model to an environment where central-local politician matching forms a motivation for transfers.

7 References

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